Dec. 5, 1944. V. F. WIGAL 2,364,117

GYROSCOPIC TOY

Filed July 23, 1943

Fig. 1.

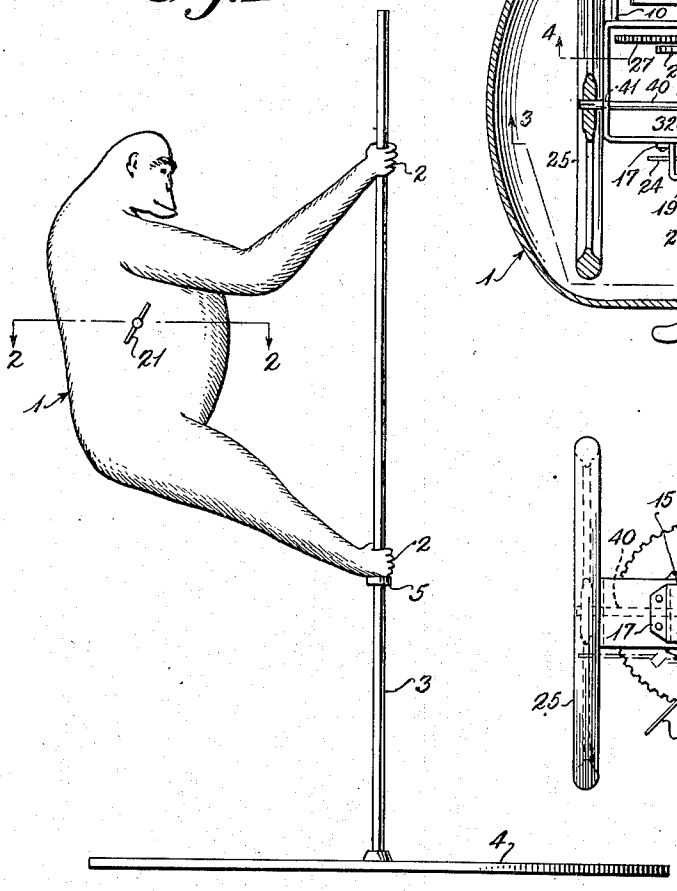


Fig. 2.

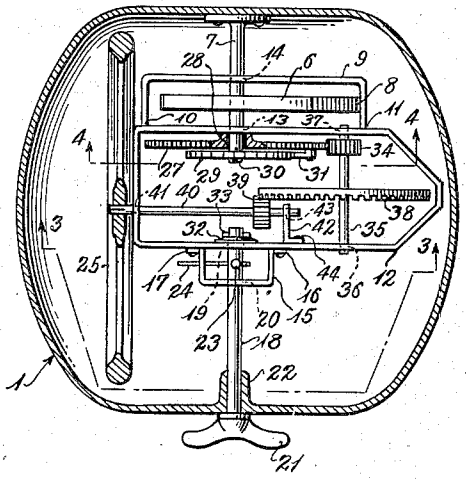


Fig. 3.

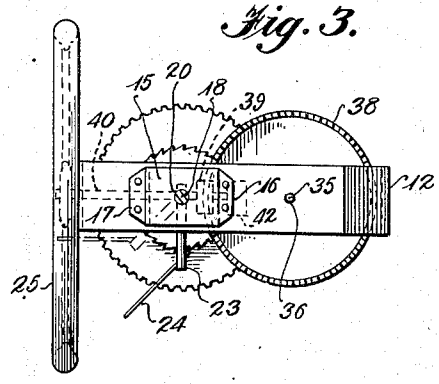


Fig. 4.

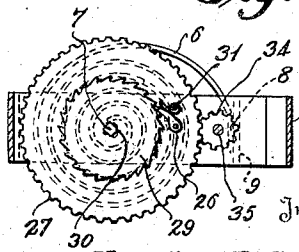
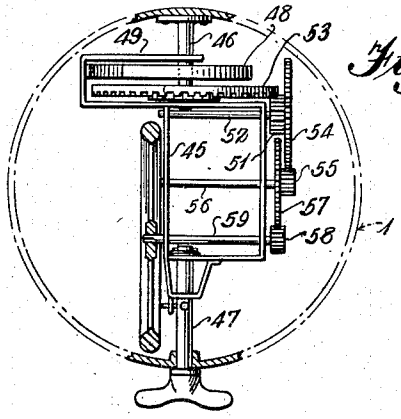


Fig. 5.



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2,364,117

GYROSCOPIC TOY

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Application July 23, 1943, Serial No. 495,905

10 Claims. (Cl. 46—50)

The present invention relates to improvements in toys and more particularly to that class of toys embodying a gyroscopic element as a part thereof.

The present invention constitutes an improvement of the structure shown in my prior Patent 2,173,031, granted September 12, 1939, and provides a novel toy in which a gyroscopic element may be driven and controlled by a motor so that the element, if desired, may be completely enclosed within the toy. The present structure eliminates the necessity of spinning the gyroscopic element by hand, and also the gyroscopic element acts as a speed regulator or governor for the motor so that no supplemental governing means is required to provide the comparatively slow speed necessary in moving the spinning gyroscopic element relative to the body of the toy.

An object of this invention is to provide an improved toy in which a gyroscopic element is mounted and actuated such that the toy will perform or move in an entertaining manner.

Another object of the invention is to provide a gyroscopic toy in which a motor is employed to rotate a gyroscopic element at a relatively high speed about its axis and to vary the direction of the axis of rotation so as to cause the gyroscopic element to precess and cause varying movement of the toy.

It is a further object of the invention to provide a gyroscopic toy which includes as a part thereof a common means for imparting movement in a cyclic path to the gyroscopic element relative to the body of the toy and for rapidly rotating or spinning the gyroscopic element about its own axis.

Other and further objects of the invention will be apparent from the following description taken in conjunction with the drawing, in which:

Fig. 1 is an external view of one form of the toy and illustrates a convenient manner of mounting it for movement about an axis.

Fig. 2 is an enlarged cross-sectional view taken on the line 2—2 of Fig. 1 and shows a gearing arrangement for accomplishing the purpose of the invention.

Fig. 3 is an elevational view taken on the line 3—3 of Fig. 2 and depicts the structure for preventing the rotation of the gyroscopic element during the winding operation.

Fig. 4 is a detailed view of certain of the gears and shows a ratchet arrangement providing for the winding of the spring motor without causing the gears and gyroscopic element to turn.

Fig. 5 is a cross-sectional view and represents a modified form of the invention yielding a more compact unit.

Referring now to the drawing, the numeral 1 indicates the exterior or body portion of the toy. In Fig. 1 is shown one way of mounting a toy of gorilla-like configuration. The body is secured at two points, designated by the numeral 2 and represented as the hands and feet of the animal, to a vertical shaft 3 mounted on a base 4 in such a manner that the toy is free to rotate about the shaft as an axis. The desired elevation of the toy with respect to the shaft may be maintained by fixedly securing an abutment 5 to the shaft. As will be more particularly described hereinafter, when the mechanism of the toy is set in motion, it will perform about the shaft in an amusing and entertaining manner. It is understood, of course, that the type of toy and its supporting mechanism is merely for the purpose of illustration and that the toy may be of any shape whatsoever and pivoted at any number of points upon the axis about which it is to perform. For example the extensions from the points of contact with the axis to the body of the toy, here represented as the arms and legs, may be pivoted to the body portion and even at points intermediate the body and axis. These extensions may be of any desired length, it being kept in mind that, in general, the shorter they are, the greater will be the number of revolutions about the axis obtained by a single winding. Thus the mechanism could be readily adapted to the type of toy illustrated in my previous patent referred to above.

Referring to the mechanism, itself, a preferred form of which is shown in Fig. 2, it will be noted that a spring type motor has been chosen for convenience of illustration. It is to be realized that any other suitable means of actuation, for example an electric motor, could be used. In the drawing, the spring motor 6 is attached at its one end to a fixed standard 7 which is in turn riveted or fastened by any other suitable means to the toy body 1, and at its other end by any suitable means to a point 8 on the member 9, which is rigidly secured at 10 and 11 to the frame 12. The fixed standard 7 projects through apertures 13 and 14 in the member 9 and one side of the frame 12 to provide a bearing for the frame 12. The frame 12 and a supplemental frame 15 rigidly attached to the frame 12 at 16 and 17 are also journaled on a key shaft 18 at the points 19 and 20, key shaft 18 being aligned with the fixed shaft 7. The members 9 and 15

in conjunction with the frame 12 maintain the frame in alignment with the shafts 7 and 18. The shaft 18 is journaled for rotation by the key 21 in the boss 22 extending inwardly from the body portion 1.

Fig. 2 and more particularly Figs. 3 and 4 illustrate a structure by which the spring motor can be wound without causing the gears and gyroscopic element to turn, thus saving wear on the moving parts and generally facilitating the winding operation. To the key shaft 18 is rigidly attached an arm 23 to which is attached a spring catch 24 at an angle such that when the key as shown in the drawing is turned in a clockwise direction, the spring catch will be projected between the spokes of the gyroscopic element 25 and prevent it from turning. The clockwise movement of the arm 23 is limited by its contacting the member 15, a further turning of the key serving to rotate the entire framework and wind the spring motor 6. Acting in conjunction with the spring catch just described is a pawl 26 attached to a gear 27 journaled on the shaft 7 at 28 and engaging the teeth of a ratchet 29 which is locked on the shaft 7 at 30.

Thus it becomes apparent that pawl 26, which may be urged toward the ratchet by a spring element 31, will allow the frame to turn in a clockwise direction to wind the spring motor without rotation of the gears or gyroscopic element. When the spring motor is released, which can be accomplished by turning the key in a counterclockwise direction, thus withdrawing the spring catch from between the spokes of the gyroscopic element, the gear 27 will be locked with respect to the ratchet 29 and the shaft 7. For preventing the spring catch from engaging the spokes of the gyroscopic element during the operation of the toy, a spring washer 32 may be held by a pin 33 through the key shaft 18 against one side of the frame 12 with sufficient pressure to overcome the lagging tendency caused by the rotation of the assembly.

In order to cause the necessary rapid spinning of the gyroscopic element, any suitable gear assembly may be employed which will result in the desired ratio, one suitable arrangement being illustrated in Fig. 2. A gear 34 of relatively small diameter may be locked to shaft 35 rotatably supported in apertures 36 and 37 in frame 12 so as to mesh with the gear 27 of relatively large diameter. Shaft 35 also has a gear 38 of relatively large diameter fixed thereto so as to engage gear 39 of relatively small diameter, the gear 39 being locked to shaft 40 to which the gyroscopic element is attached. The shaft 40 is journaled at its forward end in aperture 41 in the frame 12 and at its other end in an aperture 43 in the L-shaped member 42 rigidly secured at 44 to the frame.

Thus it can be seen that in the operation of the toy when the spring motor is released, the gear 34 will circumscribe a cyclic path about the gear 27 which is locked and held against rotation by the pawl 26, and through the gear assembly as set forth above, the gyroscopic element 25 will be caused to spin at the high speed which is necessary for it to efficiently perform its function, and at the same time the entire assembly is rotated at a relatively slow speed about the shaft 7.

A modified form of the invention in which greater compactness of construction is obtained is illustrated in Fig. 5. As in the form of my invention previously described, the frame here numbered 45 is journaled on a fixed shaft 46 and a key shaft 47 in alignment with each other. To the shaft 46 is attached one end of a spring motor 48 the other end of which is attached to the member 49 made integral with the frame 45 and extending to one side thereof. The gyroscopic element is positioned beneath the projection formed by the element 49. A winding and release mechanism similar to that described above may be employed with this modified form of my invention. The force necessary for the rapid spinning of gyroscopic element 25 is transmitted from the spring motor to the shaft 59 journaled on frame 45 and to which the gyroscopic element is attached by an arrangement of gears as follows: a gear 51, of relatively small diameter attached to the shaft 52 journaled on frame 45, meshes with gear 53 of a relatively large diameter, which is locked to fixed shaft 46, as it is caused to circumscribe a circle thereabout by the unwinding of the spring motor. The gear 54 of relatively large diameter also locked to shaft 52 meshes with the gear 55 of relatively small diameter attached to the intermediate shaft 56 journaled on the frame 45. Gear 57 of a relatively large diameter fixedly attached to gear shaft 56 meshes with the gear 58 of relatively small diameter locked to the gyroscopic element carrying shaft 59. It is to be noted that all of the gears are positioned outside of the frame and the shafts carrying them are arranged in parallel relationship.

It is to be understood that the device herein illustrated and described together with one modification of the same is exemplary only of a great variety of specific modifications such as may come within the scope of the following claims.

I claim:

1. A toy comprising a gyroscopic element, means for supporting said gyroscopic element and a common means for both spinning said gyroscopic element and rotating said gyroscopic element relative to the body of the toy.

2. A toy including a gyroscopic element, means for supporting said gyroscopic element, and a common means comprising a spring motor for both rapidly spinning said gyroscopic element and causing said gyroscopic element to rotate at a lower speed relative to the body of the toy.

3. A toy including a gyroscopic element, means for supporting said gyroscopic element comprising a frame journaled on a shaft carried by the toy body, and a common means for both spinning said gyroscopic element about its axis and rotating said frame with said gyroscopic element relative to the body of the toy comprising a spring motor one end of which is attached to said frame and the other end of which is attached to said shaft.

4. A toy comprising a gyroscopic element, means for supporting said gyroscopic element, and a common means comprising a spring motor for both spinning said gyroscopic element and rotating said gyroscopic element relative to the body of the toy; said gyroscopic element and said spring motor being entirely enclosed by the body of the toy.

5. A toy comprising a gyroscopic element, means for supporting said gyroscopic element, a spring motor for spinning said gyroscopic element and rotating said gyroscopic element relative to the body of the toy, and means whereby said spring motor may be wound without causing the gyroscopic element to spin.

6. A toy comprising a gyroscopic element, means for supporting said gyroscopic element, a common means including a spring motor for spinning said gyroscopic element and rotating said gyroscopic element relative to the body of the toy, a key for winding said spring motor having associated therewith a means for locking said gyroscopic element to prevent spinning during the winding operation.

7. A toy comprising a gyroscopic element, means for supporting said gyroscopic element, a common means including a spring motor for spinning said gyroscopic element and rotating said gyroscopic element relative to the body of the toy, a key for winding said spring motor having associated therewith a means for locking said gyroscopic element to prevent spinning during the winding operation, said last named means including a stop member carried by said key for engagement with said gyroscopic element when said key is turned in a direction to wind said spring motor, said stop member being withdrawn from engagement with said gyroscopic element upon reverse rotation of said key.

8. A toy including a gyroscopic element, means for supporting said gyroscopic element comprising a frame journaled on a shaft carried by the toy body, and a common means for spinning said gyroscopic element about its axis and rotating said frame with said gyroscopic element relative to the body of the toy, said common means including a spring motor connected between said toy body and said frame and gearing between said frame and said body.

9. A toy including a gyroscopic element, means for supporting said gyroscopic element comprising a frame journaled on a shaft carried by the toy body, and a common means for spinning said gyroscopic element about its axis and rotating said frame with said gyroscopic element relative to the body of the toy, said common means including a spring motor connected between said toy body and said frame, gearing between said frame and said body and a key for rotating said frame for winding said spring motor and means for preventing spinning of said gyroscopic element during rotation of said frame by said key.

10. A toy including a gyroscopic element, means for supporting said gyroscopic element comprising a frame journaled on a shaft carried by the toy body, and a common means for spinning said gyroscopic element about its axis and rotating said frame with said gyroscopic element relative to the body of the toy, said common means including a spring motor connected between said toy body and said frame, gearing between said frame and said body and a key for rotating said frame for winding said spring motor, said key being rotatable with respect to said frame and having a stop element engaging said frame for rotating said frame with said key, said stop element also engaging said gyroscopic element to prevent turning thereof during winding of said spring motor.

VOORHIS F. WIGAL.